

## **Abstracting Common Errors in the Learning of Time Intervals via Cognitive Diagnostic Assessment**

Phei-Ling Tan, Liew-Kee Kor and Chap-Sam Lim

Received: 22 May 2018. Accepted: 15 Feb 2019/Published online: 28 Feb 2019  
© CPLT 2019

### **ABSTRACT**

*This study engaged the cognitive diagnostic assessment (CDA) to abstract the common errors in the learning of time intervals based on pupils' knowledge states. CDA is a feasible testing tool that can inform us where a test taker may be prone to making errors in the tests. In this study, a cognitive diagnostic model with six attributes and 12 test items was created to evaluate pupils' performance in a diagnostic test on "duration of two inclusive dates". A total of 269 primary six pupils from 11 elementary schools participated in the study. The diagnostic test scores were analyzed using the Artificial Neural Network which generated 12 knowledge states (KS). Result shows that "100000" was the leading KS. The common errors associated with this KS in hierarchical order of prominence were: (i) exclude starting date as a day in duration; (ii) error in regrouping; (iii) compute incorrectly the sum of the two given dates; and, (iv) express incorrectly the time measurement in months and days. These identified common errors would provide a valuable basis for remedial teaching of the topic "Time". It also allows mathematics teachers to identify the inadequacy of an earlier teaching strategy and to engender an improved approach to help struggling learners shore up their basic skills.*

**Keywords:** Cognitive diagnostic assessment. Knowledge state. Concepts of time. Time intervals. Primary mathematics